Approved By:

R. D. Lichfield, Manager, Safety and Hygiene

Prepared By: T. S. Quinn

1.0 PURPOSE

The purpose of the occurrence investigation program is to provide timely technical assistance to project/functional groups, investigate appropriate occurrences, perform root cause analysis when required/requested, generate and submit occurrence reports, and assist project/functional group management in determining corrective actions and lessons learned.

This procedure is designed to complement the efforts of project/functional group management as defined in BHI-MA-02, ERC Project Procedures, Procedure 2.6, "Occurrence Investigation and Reporting". These procedures implement some or all the requirements contained in:

DOE Order 231.1A, "Occurrence Reporting and Processing of Operations Information",

DOE Manual 231.1-1A, "Occurrence Reporting and Processing of Operations Information",

DOE Order 225.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements".

2.0 SCOPE

This procedure applies to personnel in the Quality, Safety & Health (QSH) organization that are trained accident investigators serving in the capacity of Occurrence Investigators (OI).

***NOTE:** For the purposes of this procedure, project/functional managers will be included in the acronym P/FM.*

3.0 RESPONSIBILITIES

The OI is the person assigned by the Safety & Hygiene Manager to provide assistance to the project/function in determining event reportability, categorization level, and causes. The OI is responsible for the following:

- *Assisting the P/FM in determining the appropriate level of event categorization*
- *Attending any occurrence-related critiques*
- *Investigating the event to include formal root cause analysis, if appropriate*

- *Preparing notification and occurrence reports, and obtaining P/FM approval for each report*
- *Transmitting occurrence reports to the Occurrence Reporting and Processing System (ORPS) within the necessary time requirements*
- *Assisting the P/FM in developing corrective actions*
- *Updating corrective actions on the ORPS database for all occurrence reports submitted with open corrective actions*
- *Identifying adverse trends and assisting the P/FM in the analysis of that trend.*
- *Monitoring the ORPS database for approved/disapproved occurrence reports and providing feedback to the P/FM.*

4.0 PROCEDURE

4.1 Initial Categorization and Notification

1. *When notified by the P/FM that a potentially reportable event has occurred, assist the P/FM in determining the appropriate level of categorization.*

2. *If the event is categorized as an Unusual Occurrence (UO), immediately complete the notification report form using the information available at the time. Use PCORPS and stamp the report "DRAFT" when complete.*

   a. *Fax the completed form to the Occurrence Notification Center (ONC) on 376-3781. The form must reach the ONC within 1.5 hours from the time the occurrence was categorized as an unusual occurrence. Ensure the name and return phone numbers are accurate.*

   b. *Call the ONC on 376-2900 to verify receipt of the fax.*

   NOTE: *The ONC will fax the notification report form to the U.S. Department of Energy, Headquarters, Emergency Operations Center (EOC) and call the EOC to verify receipt.*

3. *If the event is categorized as an Off-Normal, notify the ONC as soon as practical, but always within 2 hours of discovery, and give the details of the occurrence.*

   NOTE*: When calling the ONC, be prepared to give the following information:*

   a. *Name, title, phone, and organization*

   b. *Facility, building, and area of the occurrence*

c. Date and time event was discovered; date and time event was categorized

d. Criteria used to categorize the event (based on Attachment 1, "Occurrence Categories and Criteria", of BHI-MA-02, Procedure 2.6)

e. The RL division involved

f. A brief description of the event and any immediate actions taken.

4. If other Hanford Site contractor personnel or facilities are involved in the occurrence, then the ONC can provide assistance in notifying that contractor.

4.2 Initial Response and Event Critique

1. If appropriate, go to the event scene and gather information. Safety & Hygiene (S&H) has an accident investigation (A/I) case located in the office of the Manager of S&H. See Attachment 1, "Accident Investigation Case Content", for the content of the A/I case.

2. If the P/FM determine a critique is necessary, then attend the critique and gather sufficient information to write the notification report.

4.3 Upgrading the Categorization

If a off-normal occurrence is upgraded to a unusual occurrence, then notify the ONC. Follow steps in Section 4.1.2 of this procedure.

4.4 Completing the Notification Report

1. Complete the notification report (blocks 1 to 19, and block 25 of the occurrence report) and forward to the P/FM. Attachment 4, "Occurrence Report Writers Guide", contains descriptions of the information to be input into each field of the report.

***NOTE:** The notification report must be completed and forwarded to the P/FM in sufficient time to receive comments, update the report, and submit the report to the ORPS before the end of the business day following categorization.*

2. As soon as practical after receiving approval from the P/FM, submit the notification report (or update report for roll-up events) to ORPS.

***NOTE**: The notification report (or update roll-up report) must be transmitted into ORPS before the end of the next business weekday, not to exceed 80 hours after the occurrence is categorized.*

4.5 Follow-up Investigation

1. *Initiate follow-up investigation of the occurrence. If appropriate, utilize the attachments to this procedure to aid in gathering the necessary information and documentation.*

2. *If the P/FM and the OI agree that the occurrence should be recategorized or that significant new information has become available (i.e., recurring consequences or additional component defects are identified), then complete an update report. Justify the change in Field #16, "Description of Occurrence", and submit the report to the P/FM by 12:00 p.m. on the next business day. After P/FM approval of the update report, submit the report to ORPS by the end of the next business day from the date of recategorization (but always within 80 hours of when the occurrence was recategorized).*

3. *Continue investigation to determine the significance, nature, and extent of impact of the event.*

4. *If a formal root cause analysis (RCA) is necessary, or if the P/FM request a formal RCA, the preferred methodology is the REASON Causal Analysis system. If the OI will be conducting the RCA, the OI must have received formal training in the REASON RCA methodology prior to performing the RCA. Refer to BHI-MA-02, Procedure 2.4, "Root Cause Analysis", for requirements when performing a RCA.*

4.6 Generating the Final Report

1. *Conclude the investigation and submit findings to the P/FM within 40 calendar days of the event. Investigation findings will be documented and submitted to the P/FM on the occurrence report form. Attachment 4 contains descriptions of information to be input into each field of the report.*

2. *On agreement of the investigation conclusions and corrective actions with the P/FM, create the final occurrence report and submit the report to the P/FM for approval.*

3. *Submit the final report to ORPS within 45 calendar days from the date of categorization. Maintain an approved copy of the report on file.*

4. *If a final report cannot be submitted within 45 days, then within 40 calendar days, submit an updated report to the P/FM. Explain the delay and estimate the date the final report will be submitted in Field 24, "Facility Managers Evaluation", of the occurrence report form.*

5. *Submit the update report to ORPS when approval is received from the P/FM. This update must be transmitted within 45 calendar days from the date of categorization.*

4.7 Rejected Reports

1. *Review the ORPS database weekly to determine if any occurrence reports were rejected.*

2. *If an occurrence report has been rejected by the RL-FR or the HQ-PM , then send a copy of the rejected report to the P/FM and include any known justification for the disapproval.*

3. *In conjunction with the P/FM, address the DOE concern and prepare and submit the revised final report to ORPS within 21 calendar days of the date of rejection.*

4. *If a revised report cannot be submitted to ORPS within 21 days after the initial report is rejected, then within 21 days, prepare and submit an updated report to ORPS to explain the delay and provide an estimated completion date for the resubmitted report in Field 24 of the report form.*

4.8 Updating Corrective Actions

If the final occurrence report is issued with incomplete corrective actions, then update the occurrence report when the status of the corrective action(s) change (such as when a corrective action is completed or a target date changes) by providing the updated information to ORPS.

4.9 Canceling a Report

If a final report has not been filed and it becomes clear that the event was not a reportable occurrence, an open occurrence report may be canceled by filing a final occurrence report explaining why the report is to be canceled. The DOE Facility Representative and Program Manager must approve cancellations through ORPS before a report can be deleted from the active ORPS database.

If the P/FM and the OI agree that a report should be canceled, then submit a final report to ORPS. In Field 16, explain why the previous categorization criteria does not apply to the event. Do not change the occurrence description.

4.10 Distribution of Occurrence Report

All distribution of occurrence reports required by DOE will be satisfied when the occurrence report is transmitted to ORPS. The OI will include, as a minimum, the following individuals on internal ERC distribution of occurrence reports:

- *Legal Counsel*
- *Lessons Learned Coordinator*
- *Price-Anderson Amendments Act Coordinator*
- *Corrective Action Tracking System Database Administrator*
- *Manager, QS&H*
- *Accountability Coordinator*
- *Project/Functional Group Management (report owner).*

The ERC Lessons Learned Coordinator (LLC) is on distribution of all occurrence reports. The LLC will use BHI-MA-02, Procedure 2.5, "Lessons Learned," to disseminate occurrence information within the ERC.

4.11 Trending

The OI will review occurrence information for trending and analysis, and early identification of deteriorating conditions. The OI will provide feedback to the P/FM if adverse trends are identified and assist in the analysis of those trends.

5.0 TRAINING REQUIREMENTS

Each individual performing as an OI must complete the following training:

1. *DOE Certified Accident Investigator Training*
2. *Introduction to Occurrence Reporting*
3. *Occurrence Report Writing*
4. *ORPS Training*
5. *Critique Training*
6. *Formal Root Cause Analysis (REASON)*

6.0 REFERENCES

BHI-MA-02, ERC Project Procedures,
Procedure 2.4, "Root Cause Analysis"
Procedure 2.5, "Lessons Learned"
Procedure 2.6, "Occurrence Investigation and Reporting"

DOE, 1997, Occurrence Reporting and Processing of Operations Information, DOE Order 231.1A, U.S. Department of Energy, Washington, D.C.

DOE, 1997, Occurrence Reporting and Processing of Operations Information, DOE Manual 231.1-1A, U.S. Department of Energy, Washington, D.C.

DOE, 1995, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, DOE Order 225.1, U.S. Department of Energy, Washington, D.C.

7.0 ATTACHMENTS

1. *Accident Investigation Case Contents*
2. *Personal Observer Statement (Example)*
3. *Sources of Facts and Evidence*
4. *Occurrence Report Writers Guide*

ATTACHMENT 1
ACCIDENT INVESTIGATION CASE CONTENTS

1. *35mm Camera w/date stamp*
2. *35mm Film*
3. *Cassette Recorder with spare tape and batteries*
4. *Magnifying Glass*
5. *Barrier Tape*
6. *Duct Tape*
7. *25' & 100' Measuring Tape*
8. *Tool Kit*
9. *Rope*
10. *(2) Weatherproof Flashlights*
11. *ZipLock Evidence Bags*
12. *Site Maps*

ATTACHMENT 2
PERSONAL OBSERVER STATEMENT (EXAMPLE)

Name: _____ *Job Title:* _____

Phone No: _____ *Supervisor:* _____

Project/Location of Event: _____

Subject/Name of Event: _____ *Event Time/Date:* _____

(Use additional paper or the back if needed for any question)

Describe the work and conditions leading up to the event:

Describe the event sequences from start to finish:

Note anything unusual you observed prior to or during the event (sights, sounds, odors, etc.)?

What was your role in the event?

What conditions influenced the event (weather, time of day, equipment, etc.):

Did people influence the event (actions, emergency response, etc.)?

What do you think caused the event?

Additional comments:

*Signature:*_____ *Date/Time:* _____

ATTACHMENT 3
SOURCES OF FACTS AND EVIDENCE

Sources of Facts & Evidence				
yes	*no*	*n/a*	*Source*	*Comments*
			Physical Evidence (equipment, fragments, spilled liquids, material samples, etc.)	
			Photographs or video recording	
			Interview questions and notes	
			Written personal statements	
			Procedures in use or related to occurrence	
			Special Work Permit (SWP)	
			Radiological Work Permit (RWP)	
			Lockout/Tagout Sheets	
			Training program handouts, material, and lesson plans	
			Similar occurrence reports	
			Modification or change requests, work orders	
			Design drawings	
			Maintenance logs	
			Operator logs & turnover notes	
			Task Sheets or Work Package	
			Related DOE documents (letters, procedures, audits, etc.)	
			Related BHI documents (letters, internal audits, etc.)	
			Non-conformance reports	
			Law enforcement reports (includes Hanford Patrol reports)	
			Medical Reports	
			Purchase orders or requests	
			Permits	

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OCCURRENCE REPORT WRITERS GUIDE
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General Information

For the occurrence reporting system to work effectively, all reports should be consistent in level of depth and definition of data fields. This guide provides an expansion of the requirements that are in DOE Order 231.1A and DOE Manual 231.1-1A and some software details.

Occurrence reports should contain sufficient information about the facility/organization, its operation, the event or condition being reported, and its significance, to facilitate action by those personnel not familiar with the details of the facility, equipment, or procedures.

This guide contains information on each data field on the occurrence report, including the kind of data that should be entered in the field to provide quality and consistency. Quality data will make it easier to retrieve and use statistics and lessons learned from the database. Any specific personal computer (PC) Occurrence Reporting Processing System (ORPS) software instructions are also included in each field.

PC ORPS contains help fields that enable the user to choose data entry items from lists. This help is available for selected fields by using the F2 key where indicated.

Report writers should avoid the use of plant specific terminology whenever possible. If an acronym is used, ensure it is spelled out when first used.

NOTE: *Occurrence reports cannot be transmitted to ORPS if they contain blank fields unless the field is specified as optional.*

To remove data from some fields in PC ORPS, place the cursor at the beginning of the field and press the CTRL and END keys together. Using the space bar or DELETE key to remove data will not always work.

Numbers on the following instructions correspond with numbers used on the occurrence report. Some fields are not numbered and only the title will precede the field information.

Conventions for Entering Dates and Times

Throughout these reports, use the MM/DD/YY format for all dates (e.g., 03/31/96) and the 24 hour format for all times (e.g., 0820 for 8:20 a.m., 1530 instead of 3:30 p.m.).

Unnumbered Fields and Fields 1 - 36

The Notification Report (including the unnumbered fields and items 1 - 19 and 25 of the occurrence report) must be completed for all reportable occurrences and submitted to ORPS in accordance with this procedure. The Notification Report is retained and updated for use in filing an Update Report (if needed) and a Final Report.

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Unnumbered Fields

Six unnumbered fields appear on the first page of the occurrence report form and should be completed as discussed below.

Name of Facility (Project)

Enter facility (project) acronym. In PC ORPS, enter the facility acronym or select F2 to see a facility code menu. Once the facility (project) code is entered, the program automatically completes the Name of Laboratory, Site or Organization, Originator/Transmitter, Job Title, and telephone information fields when the report is entered into the ORPS.

Facility Function

Enter "11". This is the code for the type of project or the activity/function performed by the facility. "11" = Environmental Restoration Operations

Name of Laboratory, Site, or Organization

The "Name of Laboratory, Site, or Organization" is automatically entered onto the report when it is transmitted. Do not enter anything in this field.

Project/Functional (P/FM) Manager/Designee

Enter the name, title, and telephone number of the P/FM or designee who approved the report. This individual is the person responsible for the contents of the occurrence report.

Originator/Transmitter

For PC ORPS users, the name, title, and telephone number of the Originator/Transmitter will be automatically entered based on authority file information. ***NOTE:*** *This is the occurrence investigator.*

Numbered Fields

Field 1 - Occurrence Report Number

A unique designator assigned automatically by ORPS when the notification report is transmitted into the system. PC ORPS will show a temporary occurrence report number in this field until the report is transmitted.

Field 2 - Report Type and Date

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Report Type

Enter an "X" in the appropriate block to identify the type of report being transmitted: (Notification Report, Update Report, or Final Report). Use an Update Report when an occurrence is recategorized or when additional information becomes available. Note that the ORPS logic causes the following report type restrictions:

- *The first Update Report cannot be created if a Notification Report has not been transmitted.*
- *A Final Report cannot be created if a Notification Report has not been transmitted. The cycle must maintain the order: Notification, Update (if used), and Final.*
- *To cancel an occurrence report, mark the Final Report block in field 2, "Report Type and Date", and the canceled block in the Occurrence Category block (field 3). Canceled reports must be finalized and go through the same approval process as all other occurrence reports; however, fields 20 through 35 are not required for canceled reports. All cancellations will require a justification to be included in field 16, "Description of Occurrence". Do not alter the description of the occurrence when adding the justification. The occurrence report will be removed from the active data base after the cancellation is signed by the DOE facility representative and program manager.*

Field 3 - Occurrence Category

Enter an occurrence category code from the following list:

E - Emergency
U - Unusual occurrence
O - Off-Normal occurrence
C - Canceled

Field 4 - Number of Occurrences (2 fields)

Enter the number of occurrences included in this report. The number will always be one (1) unless the requirements for Roll-Up Reports are met. Refer to BHI-MA-02, procedure 2.6, Attachment 2 for detailed instructions and requirements for rolling up non-finalized and finalized occurrence reports. If the current event will be rolled into a finalized report, enter the original occurrence report number. This field will be blank if it is not a roll-up report.

Field 5 - Division or Project

Enter the project under which the occurrence took place.

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Field 6 - DOE Secretarial Office

Enter "EM". All ERC projects are under the Environmental Management branch of DOE.

Field 7 - System, Building, or Equipment

List the systems, equipment, or structural items involved in the occurrence. In addition, in the case of component failures or defective parts or materials, provide such information as the manufacturer, model number, size, etc. List the most significant item(s) here. Since this entry is limited to 1 line of text, additional items can be listed in field 16.

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Field 8 - Unclassified Controlled Nuclear Information (UCNI)

Enter "No" to indicate the report contains no unclassified controlled nuclear information.

Field 9 - Plant Area

List the name of the site-specific plant area where the occurrence took place (i.e., 100-N, 200 East, 200 West, 300, 400, 600, 1100, or 3000 Area).

Field 10 - Date and Time Occurrence Was Discovered

Enter the date and time that project personnel discovered the event or condition being reported.

Field 11 - Date and Time Occurrence Was Categorized

Enter the date and time when the project manager determined that the event/condition constituted a reportable occurrence and categorized it. For occurrences that are upgraded or downgraded in category, the latest recategorization time and date should be documented in field 24, "Evaluation by Facility Manager".

Field 12 - DOE Notification (for UO & Emergency events only)

Enter the name of the DOE-HQ program manager and the date and time when the DOE-HQ EOC was notified (enter the name of the DOE-RL Facility Rep. notified in field 13, "Other Notifications"). These entries are mandatory if the occurrence was coded as an emergency (E) or an unusual occurrence (U) in the category field. In the case of subsequent notifications due to a change in category level, etc., enter the latest date and time of notification in field 19, "Immediate Actions Taken and Results".

Field 13 - Other Notifications

This optional field may be used to record the dates, times, names, and organizations of up to five other persons notified (such as notifications to the RL facility representative, state and local officials, other agencies, or other contractor orgs.). Individuals/agencies notified by the ONC can be obtained by calling the ONC.

NOTE: *This field is limited to 5 entries. If additional notifications need to be recorded in the occurrence report, list them in field 19, and use the same format as required in this field.*

Field 14 - Subject or Title of Occurrence

Enter a concise subject or title for this report (limited to 140 characters of text [2 lines]) that best details the nature, cause, and result of the occurrence (i.e., government vehicle accident, suspect/counterfeit items, contamination found outside a radiological controlled area). The title should describe the occurrence, not

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OCCURRENCE REPORT WRITERS GUIDE
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merely restate the exceeded criteria or nature of occurrence. This information should not change with subsequent versions of the report.

NOTE: *If the occurrence involved an Unreviewed Safety Question, the acronym "USQ" must be placed in parenthesis at the end of the subject/title. If the report is a nonfinalized or finalized Roll-Up Report, the word "Roll-Up" must be placed in parenthesis at the end of the subject/title.*

Field 15 - Nature of Occurrence

Enter up to three codes from Table 1 of this guide, that best describes the nature of the occurrence. Always list the criteria that determined the highest category level first. List all that are applicable and appropriate. Note: Only one entry from each category is allowed. ORPS will not accept two codes from the same category (i.e., 1A and 1C). Only one code is required.

Field 16 - Description of Occurrence

Enter a clear, concise, objective description of what happened and was observed. To the maximum extent possible, provide a sequence of events. Do not include an evaluation of the occurrence, causes, or corrective actions taken in this field. Provide at least the following information, if applicable:

- *The method of discovery*
- *Any component failures and failure modes*
- *Any personnel errors involved, including the type and result of the error*
- *Any procedure problem encountered*
- *The response of any automatic or manual safety systems and the signals that initiated and terminated their operation*
- *The duration of any failures*
- *Operator actions that affected the course of events*
- *The loss of any safety equipment*
- *For contamination events, include the information described in pages 18-23 of this attachment*

When ORPS, reference appropriate photos, sketches, or drawings as attachments to the report and explain how to obtain the referenced items in the report.

Notes to the writer: The event description should begin with a concise, objective summary paragraph of what happened, when and where it happened (chronological sequence of events), and the consequences of the event. The writer should keep in mind that the occurrence reports are for the entire DOE community as well as the public. The description should contain some background information concerning the facility or equipment involved. A brief description of the function/purpose of the facility is usually helpful. All reports should be written so that individuals unfamiliar with facility operations can readily understand the occurrence and its consequences.

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Since the first ten lines of the description appear on the ORPS Summary Report, try to include the most significant information within these lines. When an action is discussed, it should be clearly stated why that action occurred or was taken (i.e., required by procedure, personnel were trained to do it that way, or automatic/designed feature). If an action is mentioned but not explained, the result is an unanswered question in the reader's mind.

NOTE: *For guidance on using this field to report radiological contamination occurrences, see Table 3 at the end of this guide.*

Field 17 - Operating Conditions of Facility at Time of Occurrence

Enter a brief (up to 140 characters) description of the operational status of the facility or equipment at the time of the occurrence.

For example, this may include pertinent temperatures, pressures, or other parameters necessary for evaluation of the occurrence and its consequences. Entering "Normal Operations" is not sufficient. The author may know what this means, the reader may not. If this information is not applicable (i.e., had no bearing on cause or consequence), enter "Does not apply".

Field 18 - Activity Category

Enter an activity category number code from the following list that best describes the ongoing activity at the time of the occurrence:

1	*Construction*
2	*Maintenance*
3	*Normal Operations*
4	*Startup*
5	*Shutdown*
6	*Facility/System/Equipment Testing*
7	*Training*
8	*Transportation*
9	*Emergency Response*
10	*Inspection/Monitoring*
11	*Facility Decontamination/Decommissioning*

Example: Maintenance work, even though performed during a shutdown of the facility, should be coded as "maintenance" not "shutdown". Item #3, "Normal Operations" should be used only in the event that none of the other selections fits the on-going activity at the time of the occurrence.

Field 19 - Immediate Action Taken and Results

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Describe the immediate or remedial actions taken to return the facility, system, or equipment item to service, or to correct or alleviate the anomalous condition, and describe the results of those actions. The actions cited may be temporary measures necessary to keep the facility in safe standby condition or those used to permit continued operation of the facility without compromising safety until a more searching investigation or permanent solution can be effected.

Also record the results of those actions. These should only include those actions taken in the short term (i.e., hours) to correct the condition. Other long term actions, such as ordering and installing a new valve, should be stated in field 26, "Corrective Actions".

Include actions that should be taken immediately by other projects/activities to prevent a similar event or condition, or recommendation for further investigation and analysis.

For occurrences that were upgraded, downgraded or canceled, the previous category, categorization time and notifications should be documented here. Include any additional notifications unable to be recorded in field 13. Enter the date and time of the notification, along with the individuals name and organization.

NOTE: *For guidance on using this field when reporting radiological contamination occurrences, see Table 3 at the end of this guide.*

Fields 20, 21, and 22 - Causes

Fields 20 through 22 deal with the cause(s) of the occurrence. Use the codes from Table 2, of this guide.

The cause(s) of each occurrence must be thoroughly addressed as the information necessary to evaluate it becomes available. Enter the cause(s) that best describes the apparent direct and contributing cause. Only one direct cause may be selected, but up to three contributing causes may be entered. One root cause must be chosen.

The final evaluation (field 24) of a reportable occurrence must include a complete consideration of the cause and contributory factors, and provide analysis to show what causes were root to the occurrence and which were only contributory.

Field 20 - Direct Cause

Enter <u>one</u> code from Table 2 for the cause that directly led to the occurrence. For example, in the case of a leak, the direct cause is the failure in the component or equipment that leaked. In the case of a system misalignment, the direct cause is operator error in the alignment. This entry is mandatory for Final Reports.

Field 21 - Contributing Causes

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Optional. Enter up to three codes from Table 2 to identify contributing causes. Do not enter more than one cause code from each group. (A contributing cause is one which would not have caused the occurrence by itself but which, when present, permitted or aggravated the occurrence.)

For example, in the case of a leak, the contributing cause could be lack of adequate operator training in leak detection and response, resulting in a more severe event than would have otherwise occurred. In the case of a system misalignment, the contributing cause could be excessive distractions to the operators during a shift, resulting in less than adequate attention to important details during system alignment.

Field 22 - Root Cause

Enter one code from Table 2 for the cause which, if corrected, would prevent recurrence of this and similar occurrences. This is mandatory for Final Reports. This is to be the cause that:

- *Does not apply to this occurrence only but may have generic implications to a broad group of possible occurrences*
- *Is the most fundamental aspect of the cause which can logically be identified and corrected.*

There may be a series of causes that can be identified, one leading to another; this series should be pursued until the most fundamental, correctable cause has been identified.

For example, in the case of a leak, the root cause could be a failure of management to ensure that maintenance is effectively managed and controlled. This cause could have led to the use of improper seal material or missed preventative maintenance on a component, which ultimately led to the failure. In the case of a system misalignment, the root cause could be failure in the training program, leading to operators not fully familiar with control room procedures and willing to accept excessive distractions.

When performing a formal root cause analysis (RCA), more that one root cause may be identified. If this is the case, choose one root cause from Table 2 that best describes the results of the analysis. Provide an explanation in Field #23 for any additional results.

Field 23 - Description of Cause

Discuss the causes of the occurrence, including the root, direct, and contributing causes (fields 20 - 22) and the corrective actions identified to prevent recurrence. Do not repeat a description of the occurrence, but explain the cause(s) and the factors leading to the cause(s). If a formal causal analysis was completed, identify the root cause methodology used.

Each cause identified must be discussed in sufficient detail to enable the reader to understand the analysis process and how a particular cause was determined. A detailed description of the corrective actions is required to demonstrate that the identified actions will adequately address the cause(s) of the problem.

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If separate documentation (i.e., root cause analysis) is appropriate, reference the document in this field of the report and include an explanation of how the document can be obtained.

The first 10 lines of this field are included in the ORPS Summary Report. Try to include the most pertinent information within these lines.

This entry is required for Final Reports.

Field 24 - Evaluation by P/FM

With the information available, the P/FM must provide an evaluation of the occurrence and its effect (or possible effect) on the project, system, activity, etc., given the information available at the time. The P/FM may make additional entries in this field to supplement this evaluation in subsequent update and final reports. This field is required for Final Reports, and also for Notification Reports that have a "Yes" answer to both questions in field 25 (see next entry).

Field 25 - Is Further Evaluation Required?

Enter a "Y" or "N" (yes or no) to indicate whether further evaluation is required. If "N" is chosen, no other entries are required. If "Y" is chosen, enter "Y" or "N" again to indicate if this evaluation is required before further operations.

It is expected that this entry will be "Y" for Notification and Update Reports, indicating that further evaluation is necessary and the Final Report is not ready to be issued. On Final Reports, "N" must be chosen, as all evaluations must be complete before submitting the Final Report. The other three items in this field should be blank on the Final Report.

If further evaluation is required before further operations, enter the name of the person and title, or organizational unit that will take this action and the expected date of completion.

Field 26 - Corrective Actions

Enter a description of all the corrective actions taken to prevent recurrence.

Create a title or summary of the corrective action in the first two lines. Include any planned corrective actions, their actual or scheduled completion dates, and the responsible individuals and organizations. This field is mandatory for Final Reports.

The reader should be able to relate a corrective action to the cause(s) identified in fields 20, 21, and 22. Corrective actions do not have to be complete in order to issue a Final Report, only identified and scheduled, i.e., a target completion date.

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NOTE: *A Final Report can not be transmitted to ORPS if it does not contain a target scheduled completion date for the corrective actions. To extend a target completion date, written justification must be entered onto ORPS.*

When the status of a corrective action changes, the occurrence report must be updated on ORPS.

Field 27 - Impact on Environment, Safety, and Health

Provide an assessment of the environment, safety, and health consequences and implications of the occurrence. This assessment may be based on the conditions existing at the time of the occurrence. Describe the impact of the occurrence on the worker safety or health, the environment, the public, onsite and offsite environs.

This field must include (if applicable): the amounts of hazardous or radioactive materials released, levels and types of contamination, exposures of workers or public, and known or projected environmental, safety or health impacts. The evaluation must be carried out to the extent necessary to fully assess the safety consequences and safety margins associated with the occurrence. For an occurrence related to nuclear safety, an assessment of the occurrence under alternative conditions must also be included if the occurrence could have been more severe under reasonable and credible alternative conditions such as power level or operating mode. This entry is mandatory for Final Reports.

NOTE: *For guidance when using this field to report radiological contamination occurrences, see Table 3 at the end of this guide.*

Field 28 - Programmatic Impact

Describe the impact of the occurrence on the program or project affected. This could be a loss of data, additional costs, schedule delay, or other measurable consequences of the occurrence. Lost work time, such as when a project/activity is suspended, should be included in this section. This field is mandatory for Final Reports.

Field 29 - Impact Upon Codes and Standards

If the occurrence impacts upon the requirements of national codes and standards, program standards, or DOE orders, state whether the codes or standards are adequate to prevent recurrence, along with any recommended changes to them. Is not necessary to state that a code or standard was violated. This field is mandatory for Final Reports.

Field 30 - Lessons Learned

Complete this field in the Final Report only. Include any lessons that others might learn from the occurrence that could be of importance to other projects or that should be addressed in personnel training or project

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procedures.

Consequences should not be described here unless they contribute to an understanding of the occurrence.

Field 31 - Similar Occurrence Report Numbers

Enter the report numbers of any similar occurrence(s) for this project or other projects of which you are aware.

The purpose of this item is to identify, if recognized, occurrences that might suggest a generic problem. Similar occurrence report numbers can be found by searching the ORPS.

Field 32 - User-Defined Field #1

This optional field can be used by the P/FM to store project-specific information (e.g., a cross-reference to performance indicator data).

Field 33 - User-Defined Field #2

This optional field can be used by the P/FM to store additional project-specific information (e.g., a cross-reference to a site-specific number or name).

Field 34 - DOE Facility Representative Input

This field is for use by the RL Facility Representatives; in it, they enter their evaluation of the occurrence, the initial and proposed corrective actions, the follow-up by the contractor, and any other actions DOE has taken since the occurrence. The Facility Representative may supplement the information in this field with subsequent entries as appropriate.

This is also the field where the Facility Representative is required to provide the reasons why a Final Report is rejected.

Field 35 - Program Manager Input

This field is provided for the DOE Program Manager or designee to enter his or her evaluation of the occurrence, including an evaluation of the initial and proposed corrective actions and all follow-up, and should describe any other actions that DOE has taken since the occurrence. The DOE program manager may supplement such information with subsequent additional entries, as appropriate.

This is also the field where the Program Manager is required to provide the reasons why a Final Report is rejected.

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Field 36 - Signatures

This field is for the P/FM, Facility Representative, and Program Manager approval signatures. The P/FM should fax/mail a signed copy of the report (notification, update, final) to the OI prior to transmitting the report to ORPS.

Table 1: Nature of Occurrence Codes (Field 15)

Group 1: Facility Condition	*Group 2: Environmental*	*Group 3: Personnel Safety*
1A Nuclear Criticality Safety	*2A Radionuclide Releases*	*3A Occupational Illness/Injuries*
1B Fires/Explosions	*2B Release of Hazardous Substances/Regulated Pollutants/Oil*	*3B Vehicular/ Transportation Accident*
1C Safety Status Degradation	*2C Hazardous Material Contamination*	*3C Safety Concerns*
1D Loss of Control of Radioactive Material/Spread Contamination	*2D Ecological Resources*	
1E Vital Structure/System/Component Degradation	*2E Environmental Agreement/Compliance Activities*	
1F Violation/Inadequate Procedures		
1G Oversight Activities		
1H Operations		

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Table 1: Nature of Occurrence Codes (Field 15)

Group 4: Personnel Radiation Protection	*Group 5: Safeguards/Security*	*Group 6: Transportation*
4A Radiation Exposure *4B Personnel Contamination*	*5A Criminal Acts* *5B Unaccounted for Classified Matter/ Compromised Information* *5C Substance Abuse* *5D Intelligence Activities* *5E Security Computer Equipment/Systems* *5F Unplanned/ Unscheduled Outage of Site Security System* *5G Demonstrations/ Protests* *5H Firearms* *5I Other Security Concerns* *5J Material Control and Accountability*	

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Table 1: Nature of Occurrence Codes (Field 15)

Group 7: Value Basis Reporting	*Group 8: Facility Status*	*Group 9: Nuclear Explosive Safety*
7A Cost Based Occurrences	*8A Facility/Process Activity Terminating/ Curtailing Operations*	*Group 10: Cross-Category Items*
7B Defective Item, Material, or Service	*8B Facility/Process / Activity Shutdown Extension*	*10A Collectively Significant Related Occurrences*
	8C New Facility/Process Start-up Delay	*10B Near Miss Occurrences*
		10C Potential Concerns/Issues

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Table 2: Cause Codes (Fields 20 - 22)

Equipment/Material Problem *1A Defective or Failed Part* *1B Defective or Failed Material* *1C Defective Weld, Braze, or Soldered Joint* *1D Error by Manufacturer in Shipping or Marking* *1E Electrical or Instrument Noise* *1F Contaminant* *1G End of Life Failure*	*Training Deficiency* *5A No Training Provided* *5B Insufficient Practice or Hands-On Experience* *5C Inadequate Content* *5D Insufficient Refresher Training* *5E Inadequate Presentation or Materials*
Procedure Problem *2A Defective or Inadequate Procedure* *2B Lack of Procedure*	*Management Problem* *6A Inadequate Administrative Control* *6B Work Organization/Planning Deficiency* *6C Inadequate Supervision* *6D Improper Resource Allocation* *6E Policy Not Adequately Defined, Disseminated, or Enforced* *6F Other Management Problem*
Personnel Error *3A Inattention to Detail* *3B Procedure Not Used or Used Incorrectly* *3C Communication Problem* *3D Other Human Error*	*External Phenomena* *7A Weather or Ambient Condition* *7B Power Failure or Transient* *7C External Fire or Explosion* *7D Theft, Tampering, Sabotage, or Vandalism*
Design Problem *4A Inadequate Work Environment* *4B Inadequate or Defective Design* *4C Error in Equipment or Material Selection* *4D Drawing, Specification or Data Errors*	*Radiological/Hazardous Material Problem* *8A Legacy Contamination* *8B Source Unknown*

Table 3: Reporting Radiological Contamination Occurrences

The information provided on the following pages provides guidance for completing an Occurrence Report under Group 1D or Group 4B.

The information provided for Field 27, "Impact on Environment, Safety and Health," should be completed or reviewed by qualified radiological control personnel (i.e., the Radiological Control Manager, health physicists,

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qualified radiological control technicians, or supervisory personnel). The health consequence (i.e., severity or significance) of the contamination occurrence is specified in Field 27 of an Occurrence Report.

Where the information regarding an occurrence is preliminary, the notification of such occurrences should be prefaced with remarks to the effect that:

"The contamination occurrence is based on preliminary information available at the time of the report. This information will be updated when further evaluation has been completed."

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Personnel Contamination Occurrences

Description of Contamination Occurrence - Item 16	
Type of information	*Suggested statements*
1. Number and types of individuals	*a. Contamination event involves single individual.* *b. Contamination event involves _____ individuals.* *c. Type of individual: radiation worker, general employee, member of the public, minor, visiting scientist or researcher, visiting DOE or other Federal employee.*
2. Type of contamination event	*a. Only personal clothing of worker contaminated.* *b. Skin contamination involved.* *c. Potential internal contamination from inhalation/ingestion, further assessment being performed.* *d. Facial/nasal contamination, possible internal contamination.* *e. Internal contamination confirmed by bioassay.* *f. Radionuclide(s) involved if known. State general category (i.e., beta and/or gamma, alpha, etc.) if unknown.*
3. Extent of contamination	*a. Appropriate description of clothing (e.g., pants, shoes, shirt, etc.).* *b. Confined to limited area of body (e.g., tip of right index finger, hot particle on left shoulder, palm of right hand, etc.).* *c. If not confined, state area of body involved.* *d. Maximum detected activity: _____ dpm/100 cm^2.*
4. Location (area) where contamination occurred & worker activity	*a. Occurred inside of radiological area (e.g., Contamination Area, High Contamination Area, Airborne Radioactivity Area).* *b. Occurred outside of radiological area, but onsite or within the facility.* *c. State worker activity being performed at time of occurrence.*
5. Significance of occurrence relative to operations	*a. Isolated event confined to room/facility/ building/area.* *b. Event resulting from equipment or protective clothing malfunction.* *c. Event resulting from procedural violation or deficiency.* *d. Recurrent event.*

Immediate Action in Response to Contamination Occurrence - Item 19	
Type of information	*Suggested statements*

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1. Status of decontamination	*a. Personal clothing retained.* *b. Individual(s) successfully decontaminated below detectable levels.* *c. Individual(s) decontaminated below reporting criteria; however, residual contamination persists.* *d. Medical assistance required.*

Impact on Worker Health Due to Contamination Occurrence - Item 27	
Type of information	*Suggested statements*
1. Relative health consequence	*a. Less than/Approaching ____% of the annual deep or shallow DOE skin, lens of the eye, extremity, and/or committed effective dose limit (for any internal intake), as applicable. (Do not provide comparison to site or facility administrative control level). No health consequence to individual(s).* *b. Greater than applicable DOE limit, potential health consequence being evaluated. Evaluation to be initiated pursuant to DOE 5484.1 requirements.* *c. Concurrent injury requiring medical assistance onsite/offsite. State option a or b, as applicable, and nature of injury.* *d. No concurrent injury. State option a or b, as applicable. Indicate whether decontamination required onsite/offsite medical assistance.*

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Area or Facility Contamination Occurrences

Description of Contamination Occurrence - Item 16	
Type of information	*Suggested statements*
1. Location of occurrence	*a. Room.* *b. Building.* *c. Facility.* *d. Area.* *e. Site.*
2. Type of contamination	*a. Spill or loss of containment.* *b. Airborne release.* *c. Fixed/loose surface contamination.* *d. Radionuclide(s) involved if known. State general category (i.e., beta and/or gamma, alpha, etc.) if unknown.*
3. Extent of contamination	*a. Total area involved is ____ft^2.* *b. Confined within room/building/facility/area/ site.* *c. Release beyond or containment within above locations, as applicable.*
4. Impact on operations	*a. Normal operation not impacted.* *b. Designated equipment removed from service.* *c. Personnel access restricted until cleanup is completed.*

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Immediate Action in Response to Contamination Occurrence - Item 19	
Type of information	***Suggested statements***
1. Status of control & decontamination	*a. Affected area controlled and/or isolated to prevent spread of contamination.* *b. Decontamination initiated or completed.*

Impact on Worker Health Due to Contamination Occurrence - Item 27	
Type of information	***Suggested statements***
1. Status of control	*a. No contamination of individual(s) onsite.* *b. No potential for further spread of contamination.* *c. Affected area decontaminated.*
2. Significance relative to applicable limits	*a. Maximum contamination levels _____ dpm/100 cm^2 and units of curie per 100 cm^2.* *b. Comparison with HSRCM-1 Table 2-2 limits. Evaluation to be initiated pursuant to DOE 5484.1 dependent upon level by which Table 2-2 is exceeded.* *c. General area dose rate as measured at 1 meter above contaminated surface.* *d. If worker involved, relate dose rate to actual dose received based on occupancy time spent in the contaminated area.* *e. No health consequence to worker if less than applicable dose limit. If worker contaminated, implement responses for personnel contamination provided above.*